

# IDAHO DEPARTMENT OF FISH & GAME



HENRYS FORK FISHERIES INVESTIGATIONS  
1977

by  
John C. Coon  
Senior Fishery Research Biologist

April, 1978

## TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGEMENTS .....	1
ABSTRACT .....	2
RECOMMENDATIONS .....	4
Section 12-A (McCrea Bridge to Coffee Pot Lodge) .....	4
Section 12-B (Coffee Pot Lodge to the Fish Trap) .....	4
Section 12-C (Fish Trap to Macks Inn Bridge) .....	4
Section 13-A (Macks Inn Bridge to North Fork Club) .....	5
Section 13-B (North Fork Club to Railroad Trestle below Big Springs) .....	5
Entire Upper Henrys Fork .....	5
OBJECTIVES .....	6
INTRODUCTION .....	6
TECHNIQUES USED .....	7
Angler Effort and Harvest .....	7
Angler Questionnaire .....	7
Age and Growth of wild Fish .....	7
Hatchery Returns .....	9
FINDINGS .....	9
Angler Effort and Harvest .....	9
Section 12-A (McCrea Bridge to Coffee Pot Lodge) .....	10
Section 12-B (Coffee Pot Lodge to the Fish Trap) .....	15
Section 12-C (Fish Trap to Macks Inn Bridge) .....	23
Section 13-A (Macks Inn Bridge to North Fork Club) .....	27
Section 13-B (North Fork Club to Railroad Trestle below Big Springs) .....	30
Angler Questionnaire .....	33
Age and Growth of wild Fish .....	33
Hatchery Returns .....	39
Nongame Fish .....	39
DISCUSSION .....	39
Comparative Fishing Quality of the Census Sections .....	39
Trends in Fishing Quality .....	45
Comparison with Other Trout Streams .....	46
Growth Potential .....	51
LITERATURE CITED .....	51

## LIST OF TABLES

	<u>Page</u>
Table 1. Total estimated angling effort, harvest and catch rates for 16.7 km of the Henrys Fork of the Snake River (McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977 .....	11
Table 2. Estimated mean total length of game fish harvested by anglers from 16.7 km of the Henrys Fork of the Snake River (McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977 .....	12
Table 3. Estimated angler profile on 16.7 km of the Henrys Fork of the Snake River (McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977 .....	13
Table 4. Estimated angler success by type of fishing gear used on 16.7 km of the Henrys Fork of the Snake River (McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977 .....	14
Table 5. Total estimated angling effort, harvest and catch rates for Section 12-A of the Henrys Fork of the Snake River (3.1 km from McCrea Bridge to Coffee Pot Lodge), 28 May to 30 September 1977 .....	16
Table 6. Estimated mean total length of game fish harvested by anglers from Section 12-A of the Henrys Fork of the Snake River (3.1 km from McCrea Bridge to Coffee Pot Lodge), 28 May to 30 September 1977 .....	17
Table 7. Estimated angler profile on Section 12-A of the Henrys Fork of the Snake River (3.1 km from McCrea Bridge to Coffee Pot Lodge), 28 May to 30 September 1977 .....	18
Table 8. Total estimated angling effort, harvest and catch rates for Section 12-B of the Henrys Fork of the Snake River (2.2 km from Coffee Pot Lodge to the fish trap), 28 May to 30 September 1977 .....	20
Table 9. Estimated mean total length of game fish harvested by anglers from Section 12-B of the Henrys Fork of the Snake River (2.2 km from Coffee Pot Lodge to the fish trap), 28 May to 30 September 1977 .....	21

# LIST OF TABLES (Continued)

	<u>Page</u>
Table 10. Estimated angler profile on Section 12-B of the Henrys Fork of the Snake River (2.2 km from Coffee Pot Lodge to the fish trap), 28 May to 30 September 1977 .....	22
Table 11. Total estimated angling effort, harvest and catch rates for Section 12-C of the Henrys Fork of the Snake River (4.6 km from the fish trap to Macks Inn Bridge), 28 May to 30 September 1977 .....	24
Table 12. Estimated mean total length of game fish harvest by anglers from Section 12-C of the Henrys Fork of the Snake River (4.6 km from the fish trap to Macks Inn Bridge), 28 May to 30 September 1977 .....	25
Table 13. Estimated angler profile on Section 12-C of the Henrys Fork of the Snake River (4.6 km from the fish trap to Macks Inn Bridge), 28 May to 30 September 1977 .....	26
Table 14. Total estimated angling effort, harvest and catch rates for Section 13-A of the Henrys Fork of the Snake River (2.1 km from Macks Inn Bridge to the North Fork Club), 22 May to 30 September 1977 .....	28
Table 15. Estimated mean total length of game fish harvested by anglers from Section 13-A of the Henrys Fork of the Snake River (2.1 km from Macks Inn Bridge to the North Fork Club), 28 May to 30 September 1977 .....	29
Table 16. Estimated angler profile on Section 13-A of the Henrys Fork of the Snake River (2.1 km from Macks Inn Bridge to the North Fork Club), 28 May to 30 September 1977 .....	31
Table 17. Total estimated angling effort, harvest and catch rates for Section 13-B of the Henrys Fork of the Snake River (4.7 km from North Fork Club to the railroad trestle below Big Springs), 28 May to 30 September 1977 .....	32

# LIST OF TABLES (Continued)

	<u>Page</u>
Table 18. Estimated mean total length of game fish harvested by anglers from Section 13-B of the Henrys Fork of the Snake River (4.7 km from Macks Inn Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977 .....	34
Table 19. Estimated angler profile on Section 13-B of the Henrys Fork of the Snake River (4.7 km from Macks Inn Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977 .....	35
Table 20. Summary of Henrys Fork questionnaire as presented to anglers on Sections 12 and 13 of the Henrys Fork of the Snake River (16.7 km from McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977.....	36
Table 21. Calculated mean total lengths and annual increments of growth for wild rainbow samples from angler creels on the Henrys Fork of the Snake River (16.7 km from McCrea Bridge to railroad trestle below Big Springs), 28 May to 30 September 1977 .....	37
Table 22. Calculated mean total lengths and annual increments of growth for brook trout sampled from angler creels on the Henrys Fork of the Snake River (16.7 km from McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977 .....	38
Table 23. Estimated return to the creel of hatchery rainbow trout released as "catchables" in the Henrys Fork of the Snake River (16.7 km from McCrea Bridge to the railroad trestle below Big Springs), 2 May to 30 September 1977 .....	40
Table 24. Comparison of total estimated angling effort, harvest and catch rates for Sections 12 and 13 of the Henrys Fork of the Snake River, 28 May to 30 September 1977 .....	42
Table 25. Comparison of the estimated mean total length of game fish harvested by anglers from Sections 12 and 13 of the Henrys Fork of the Snake River, 28 May to 30 September 1977 .....	43

## LIST OF TABLES (Continued)

	<u>Page</u>
Table 26. Comparison of estimated angler profiles for Sections 12 and 13 of the Henrys Fork of the Snake River, 28 May to 30 September 1977 .....	44
Table 27. Comparison of angler effort, harvest and catch rate estimates for Sections 12 and 13 of the Henrys Fork of the Snake River from opening day to 31 August of 1976 and 1977 .....	47
Table 28. Comparisons of the mean total lengths and size distribution of trout sampled from anglers' creels in Sections 12 and 13 of the Henrys Fork of the Snake River in 1976 and 1977 .....	48
Table 29. Comparison of estimated angler profiles for Sections 12 and 13 of the Henrys Fork of the Snake River from opening day to 31 August of 1976 and 1977 .....	49
Table 30. Comparison of the estimated total angling effort, trout harvest and catch rates for the May-September fisheries of Sections 12 and 13 of the Henrys Fork of the Snake River, the Snoball section of the Madison River and Section 1 of the South Fork of the Boise River .....	50
Table 31. Comparison of the estimated mean total lengths of wild rainbow and all trout harvested by anglers during the May-September fisheries of Sections 12 and 13 of Henrys Fork of the Snake River, the Snoball section of the Madison River and Section 1 of the South Fork of the Boise River .....	52

## LIST OF FIGURES

Figure 1. Census sections for the 16.7 km (10.4 mi) of the Henrys Fork of the Snake River from McCrea Bridge to the railroad trestle below Big Springs .....	8
--	---

#### ACKNOWLEDGEMENTS

Funding for this project was provided by the Flat Rock and North Fork fishing clubs of Island Park, Idaho. We thank Larry Hogue and Thom Murdock for their assistance and cooperation during our field work.

Data interpretation and recommendations contained in this report are those of Senior Fishery Research Biologist John Coon and represent his judgement on the best alternatives for increasing the quality of fishing in the study area. Other management alternatives are available and the recommendations listed in this report do not necessarily represent the Idaho Department of Fish and Game's program direction. However, this data will be evaluated along with other alternatives in arriving at a management plan for this upper section of river.

## HENRYS FORK FISHERIES INVESTIGATIONS

### ABSTRACT

From 28 May to 30 September 1977, we used random angler counts and interviews to estimate total angler effort, harvest, total catch rate, species composition and average size of creeled fish on 16.7 km (10.4 mi) of the upper Henrys Fork of the Snake River from McCrea Bridge to the railroad trestle below Big Springs. Our interviews covered an estimated 6.3% of the total angler hours.

During the census period, anglers fished an estimated 51,899 hours to harvest 34,127 game fish (0.66 game fish per hour). The harvest consisted of 12,913 (38%) hatchery rainbow catchables, 8,550 (25%) wild rainbow, 7,972 (23%) eastern brook trout, 1,535 (4%) kokanee, 1,216 (4%) whitefish, 1,082 (3%) hatchery rainbow planted as fingerlings in 1976, 422 (1%) rainbow-cutthroat hybrids, 305 (1%) cutthroat and 132 (<1%) coho. Anglers caught and released an additional 75,354 game fish which made the estimated total game fish catch rate 2.11 game fish per hour.

The estimated mean total length of all game fish harvested was 243 mm (9.6 in). Whitefish had the highest average length, 375 mm (14.8 in), and brook trout were the smallest, 215 mm (8.5 in). Wild rainbow averaged 246 mm (9.7 in), rainbow-cutthroat hybrids 314 mm (12.4 in), hatchery rainbow catchables 230 mm (9.1 in), cutthroat trout 340 mm (13.4 in), kokanee 333 mm (13.1 in) and coho 287 mm (11.3 in).

Fifty percent of the anglers fishing the upper Henrys Fork were residents of Idaho. Anglers using boats accounted for 29% of all anglers counted. Bait anglers accounted for 54% of the total effort during the creel census, while fly fishermen accounted for 31%.

Section 13-A (Macks Inn to North Fork Club) received the heaviest fishing pressure within the study area and along with Section 12-C (fish trap to Macks Inn) provided the smallest fish and highest percent of hatchery catchables. Sections 12-A and B (McCrea Bridge to the fish trap) provided anglers with the largest fish and high catch rates. Section 13-B (North Fork Club to the railroad trestle) had the greatest usage by boat anglers and provided larger fish than Sections 12-C and 13-A, but at a reduced catch rate. The best fishing generally occurred early and late in the season.

Our angler questionnaire indicated that 42% of the anglers rated their fishing on upper Henrys Fork as "good" or "excellent". Of those who rated it as "fair" or "poor", 58% cited the small size of fish as the prime cause of their dissatisfaction. Only 29% of the anglers above Macks Inn were in favor of further restrictions to help improve the quality of the fishery while 47% of the anglers fishing below the resort indicated such a willingness. A majority of anglers were against allowing people to fish from a boat with motor attached.

The growth of wild rainbow and brook trout in upper Henrys Fork is good,



however, brook trout inherently grow more slowly and mature and die earlier than rainbow. Thus, they will probably never supply large numbers of fish greater than 305 mm (12 in) to the Henrys Fork fishery.

About 32% of the hatchery rainbow catchables released into upper Henrys Fork were harvested by anglers.

Utah chubs were caught by anglers as far upstream as the North Fork Club.

A comparison. of the fishery data for upper Henrys Fork in 1976 and 1977 shows that the fishing pressure has begun to level out or even decrease slightly in 1977. The total catch rate has increased, but the mean length of harvested trout has decreased slightly.

Author:

John C. Coon  
Senior Fishery Research Biologist

## RECOMMENDATIONS

In some sections, particularly at certain times of the year, upper Henrys Fork provides anglers with numerous large trout and salmon. However, for the most part, the fishery is characterized by an abundance of small to medium sized trout of both wild and hatchery origin. Habitat improvement and the use of carefully selected and matched hatchery stocks (when and if available) could help increase the average size of fish creeled from the Henrys Fork. However, with the intensive angling pressure now occurring in the censused area, any significant improvement in fish size will probably require a reduction in fish harvest and/or fishermen-induced mortality (hooking and handling).

Obvious differences in angler composition and expectations, habitat type and established recreational patterns exist in the various sections of upper Henrys Fork. As reflected in the angler questionnaire, many anglers are satisfied with the present quality of the fishery or are not willing to be subjected to further restrictions in order to increase fish size. To others, fish size is all important. Therefore, I arrived at my recommendations for the five census sections by combining the best information available on fish harvest, habitat limitations, present angler opinions and composition, and established use patterns on the river. I also tried to keep in mind that in the interest of uniform management and workable regulations, we cannot always manage each small section of water by its individual merits, even if this would be best for the resource.

### Section 12-A (McCrea Bridge to Coffee Pot Lodge)

Manage this section under the general fishing regulations. Since the fishery here depends heavily on the fluctuations of Island Park Reservoir and movement of trout and salmon out of the reservoir, little could be gained by restricting gear types unless the late summer fish harvest increases greatly.

Provide hatchery support at a minimal level by stocking catchable rainbow from McCrea Bridge immediately prior to opening day and near the first of July at about one-half the 1977 stocking level.

Few opportunities exist for habitat improvement in this section.

### Section 12-B (Coffee Pot Lodge to the Fish Trap)

Manage this section under the general fishing regulations. These waters are well suited to bait fishing and the nature of the habitat and limited access tends to protect the fish population from serious overexploitation and provide a quality fishery.

Provide no direct hatchery support to this section. It has no hatchery truck access and, at present, wild production is sufficient.

No need or opportunities exist for stream habitat improvement.

#### Section 12-C (Fish Trap to Macks Inn Bridge)

Consider managing this section as a quality fishery under a special gear restriction of lures and flies only. Encourage catch-and-release fishing and the selective harvest of brook trout, whitefish and salmon over rainbow and cutthroat.

Provide no direct hatchery support to this section. Hatchery fish seldom reach 305 mm (12 in) in length and do not provide the type of quality fishery desired in this section.

This section provides excellent opportunities for habitat improvement which could greatly increase its ability to produce and hold large trout. Deflectors could be constructed to deepen areas of the channel and brush, logs or permanent sodded structures used to provide cover along the banks. Any program of special regulations in this section may be wasted without stream improvement.

#### Section 13-A (Macks Inn Bridge to North Fork Club)

Manage this section under the general fishing regulations on a maximum harvest basis. It is lined on both sides over its entire length by recreational development and has the most intensive fishery and recreational pressure of any section on the river. It is also used by the greatest proportion of juvenile and novice fishermen.

Provide direct hatchery support to this section by releasing rainbow catchables at about the 1977 level, distributing them for maximum return to the creel.

Some opportunities for habitat improvement do exist in this section, but with the intensive fishery and massive hatchery support they are probably not worthwhile.

#### Section 13-B (North Fork Club to the Railroad Trestle below Big Springs)

Manage this section under the general fishing regulations as a quality fishing area. Encourage catch-and-release fishing and the selective harvest of brook trout, whitefish and salmon over rainbow and cutthroat. Consider allowing no fishing from motor boats to help keep angler pressure and harvest down and to keep the aesthetic qualities of the area high.

Provide no direct hatchery support to this section.

There is little need for habitat improvement within this section.

#### Entire Upper Henrys Fork

Maintain a high quality fishery in Island Park Reservoir as much of the spawning stock and large fish caught in upper Henrys Fork spend at least a part of their life in the reservoir.

Do not stock hatchery rainbow fingerlings from our present hatchery stock in upper Henrys Fork. This section of Henrys Fork has adequate natural

reproduction and already serves as a nursery for thousands of small wild trout. The hatchery fingerling do not remain or survive in upper Henrys Fork for more than one summer, few enter the creel, and those that do add nothing to the quality of the fishery. The only way in which the hatchery fingerling could aid the fishery is if they hold over in Island Park Reservoir and later return as mature fish. This has not been evaluated.

Encourage and promote the utilization of brook trout, whitefish, salmon and hatchery rainbow as the species to be harvested. All of these species can, at present, provide large numbers of fish to the harvest without any change in their population size structure. Wild rainbow and cutthroat have the best growth potential and can provide trophy-size fish if the harvest rate for them is decreased.

Henrys Lake Outlet is becoming choked with silt and is probably not providing the important nursery areas it once did for the upper river. It has also become a source of siltation to the entire upper river and may be gradually decreasing the productivity and cover there. Some mutually agreeable means of restricting cattle access to the stream banks and stabilizing the system should be worked out with the land holders involved.

#### OBJECTIVES

To evaluate the quality of the fishery of Henrys Fork of the Snake River from McCrea Bridge upstream to Big Springs.

To develop recommendations to increase fish abundance and/or fish size if either of these parameters is below desired standards.

#### INTRODUCTION

The 16.7 km (10.4 mi) of Henrys Fork of the Snake River from McCrea Bridge to the railroad trestle below Big Springs is in an intensively used summer recreation area. During the summer of 1976 this stretch of water received 32% of the total fishing effort expended on the entire 111 km (69 mi) of Henrys Fork above St. Anthony and provided 41% of the total trout harvest (Coon 1977). Probably no other similar sized section of stream in the State is fished more heavily.

With this type of fishing intensity, a decline in the quality of the fishery might be expected. Our creel census in 1976 indicated that catch rates were still high in the study area, but that the average size of trout harvested was low and possibly declining. Hatchery rainbow catchables were also providing a larger percentage of the total harvest than in 1973. The present study, therefore, provides an in-depth look at the quality of the fishery in 1977 and forms a sound basis for making recommendations to improve that quality as well as providing a base line for future evaluations.

## TECHNIQUES USED

### Angler Effort and Harvest

To provide a better evaluation of the fishery in the study area, I divided the census section into five subsections based on habitat types and fishery usage. In previous studies, this area was censused as Sections 12 and 13 of the Henrys Fork with the dividing line at the highway bridge at Macks Inn. Maintaining the same distinction, I divided Section 12 into three subsections (A, B and C) and Section 13 into two (Fig. 1).

I used a random angler count and interview procedure similar to the one outlined for 1976 (Coon 1977) to estimate angler effort, harvest and catch rates. However, all counts were made from the ground (we flew the counts in a Super Cub in 1976) by driving, motorcycling, canoeing or hiking the stream sections. Due to the extra time required to make the counts from the ground, three rather than four counts were made each day. Each subsection could be counted in 40 minutes or less.

### Angler Questionnaire

In addition to the regular creel census questions, we asked a random sample of anglers to answer additional questions about the quality of the fishery (in order to obtain sufficient angler interviews to accurately estimate the harvest, catch rates and length of fish harvested, we could not ask these questions of every angler interviewed). Anglers to be interviewed for the special questionnaire were selected by creel census personnel prior to initial contact so that prior knowledge of their angling philosophy and success could not influence our selection. No one was allowed to answer the questionnaire more than once.

### Age and Growth of Wild Fish

To determine the age and growth of wild fish in Henrys Fork, we collected scales from angler caught fish. Scales were sampled from the area just above the lateral line at the origin of the dorsal fin, mounted between slides and viewed at 47X on a microprojector. I measured the total anterior scale radius and the distance to each annulus to the nearest millimeter.

Utilizing a sample of 29 wild rainbow (representing the entire length spectrum of rainbow sampled), I found that the linear regression of the total length in millimeters on the anterior scale radius in millimeters at 47X was:

$$TL = 24.84 + 3.89 \text{ ASR}$$

$$r^2 = 0.94$$

The regression for a sample of 34 brook trout was:

$$TL = -16.06 + 9.27 \text{ ASR}$$

$$r^2 = 0.85$$

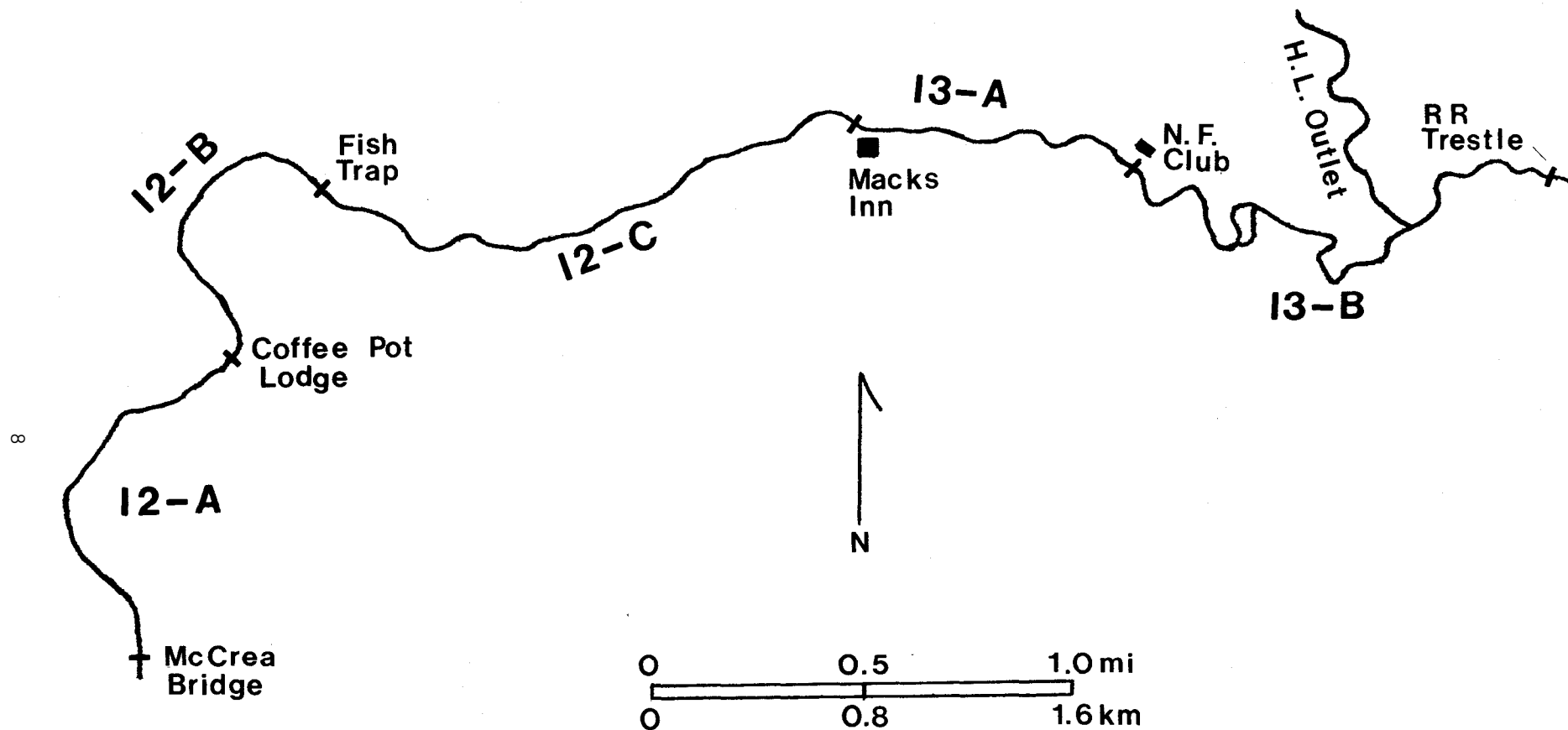


Figure 1. Census sections for the 16.7 km (10.4 mi) of the Henrys Fork of the Snake River from McCrea Bridge to the railroad trestle below Big Springs.

Using these regressions, I back-calculated the mean total length of these fish at each year of life represented by the samples.

#### Hatchery Returns

We used the occurrence of eroded fins to differentiate hatchery rainbow catchables from wild rainbow harvested in the study area. If there was any question about the fishes origin, it was classified as a wild trout. Planting records provided us with the number of rainbow released and their release sites. Since our census ended at the upper side of McCrea Bridge, I counted only one-half of the catchables planted there as being available to fishermen in the study area.

Approximately 108,200 unmarked rainbow fingerling were released into the study area in the fall of 1976. Undoubtedly many small rainbow classed as wild fish in the census were actually hatchery rainbow from this release. To estimate what percent of wild rainbow in the harvest originated from the fingerling releases, I used the estimated return rate (.01) for 25,920 marked fingerling planted in the study area in the fall of 1975 and sampled in the 1976 creel census (Coon 1977).

### FINDINGS

#### Angler Effort and Harvest

Over the entire census area (McCrea Bridge to the railroad trestle below Big Springs), we obtained angler interviews covering 3,258 hours of fishing. This was 6.3% of the total estimated angling hours occurring in this section from 28 May to 30 September 1977.

From our angler counts, I estimated that anglers fished 51,899 hours in the study area (24.7 angler hours/km/day). Fishing pressure was fairly uniform among census intervals until it began to decrease in August and September. It decreased drastically during the last half of September.

Utilizing our angler counts and interviews, I estimated that anglers harvested 34,127 game fish from the study area (2,044 game fish/km.). The harvest consisted of 12,913 (38%) hatchery rainbow catchables, 8,550 (25%) wild rainbow, 7,972 (23%) eastern brook trout, 1,535 (4%) Kokanee, 1,216 (4%) whitefish, 1,0892 (3%) hatchery rainbow planted as fingerling, 422 (1%) rainbow-cutthroat hybrids, 305 (1%) cutthroat and 132 (<1%) coho. Hatchery catchables made their highest contribution to the harvest in late July and early August (40%) and were least evident in late September (32%). Wild rainbow constituted only 24% of the harvest in late August and early September, but provided 34% of the late September harvest. Part of the decrease in late August was due to the Kokanee run out of Island Park Reservoir which provided 17% of the late August-early September harvest.

Brook trout made their greatest contribution to the fishery in late June and early July (28%) and were least evident in late September (13%). In addition to the fish harvested, I estimated that anglers caught and released 73,778 salmonids and 1,576 whitefish.

The game fish harvest rate during the study period was 0.66 game fish per hour. The total catch rate (including fish caught and released) was 2.11 game fish per hour. The harvest rate generally increased as the season progressed while the total catch rate was highest during the first and last census intervals and lowest in late July and early August (Table 1).

The estimated mean total length of all game fish harvested during the census was 243 mm (9.6 in). The largest fish measured was a 645 mm (25.4 in) wild rainbow and the smallest a 135 mm (5.3 in) brook trout.

Whitefish sampled in the creel had the highest average length of any game fish harvested, 375 mm (14.8 in). Brook trout were the smallest overall with a mean length of 215 mm (8.5 in). Wild rainbow averaged 246 mm (9.7 in), rainbow-cutthroat hybrids 314 mm (12.4 in), hatchery rainbow catchables 230 mm (9.1 in), cutthroat trout 340 mm (13.4 in), kokanee 333 mm (13.1 in), and coho averaged 287 mm (11.3 in). The average size of the harvest was smallest in mid-summer when hatchery catchables and brook trout were most numerous. All fish species showed an increase in mean length by mid-September (Table 2).

Using the angler interview data and counts, I estimated that 50% of the anglers fishing the censused portion of the Henrys Fork were residents of Idaho. Nonresidents outnumbered residents during August and September. Anglers using boats comprised 29% of the anglers counted. Bait anglers accounted for 54% of the overall effort during the creel census, while fly fishermen accounted for 31%. Bait anglers were outnumbered by fly fishermen only during the final interval (Table 3).

Anglers using lures appeared to harvest the greatest number of game fish per hour (0.79). The intensive lure fishery for kokanee in late August and September with a bag limit of 25 fish is probably responsible for this fact. Fly fishermen had the lowest harvest rate (0.60 game fish per hour), but the highest total catch rate (3.80 game fish per hour). Bait anglers were most successful late in the season, lure anglers did best in early and mid-season, and fly anglers had their best total catch rate during the first census interval (Table 4).

#### Section 12-A (McCrea Bridge to Coffee Pot Lodge)

During the census period we obtained angler interviews covering 298.5 hours of fishing in this section. This was 6.2% of the total estimated angling hours. Relatively small sample sizes per interval may not have always provided very precise estimates of fish harvest and size.

From our angler counts, I estimated that anglers fished 4,780 hours in this section of Henrys Fork (12.2 angler hours/km/day). This was 9.2% of the total estimated angler hours occurring in the study area. Fishing pressure was very uniform among census intervals until late August and September when it decreased significantly.

Utilizing our angler counts and interviews, I estimated that anglers harvested 2,408 game fish (777 game fish/km). Wild rainbow provided the single greatest contribution with 1,082 fish or 45% of the harvest (though very difficult



Table 1. Total estimated angling effort, harvest and catch rates for 16.7 km of the Henrys Fork of the Snake River (McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977.

Interval starting date	Angler hours	Total harvest <sup>1/</sup>								Total game fish		
		Wrb	Hyb	Hrb	Ct	Eb	Kok	Coho	Wf	Released	Harvested per hour	Caught per hour
28 May	12,661	2,395	221	2,471	25	1,823	32	56	400	25,944	0.59	2.64
25 Jun	13,972	2,603	88	3,611	55	2,593	0	52	258	18,724	0.66	2.00
23 Jul	13,475	2,375	50	3,456	149	2,183	109	13	224	14,413	0.64	1.71
20 Aug	10,231	1,830	63	2,968	54	1,204	1,270	11	222	13,396	0.74	2.05
17 Sep	1,560	429	0	407	22	169	124	0	112	2,877	0.81	2.65
Total	51,889	9,632 <sup>2/</sup>	422	12,913	305	7,972	1,535	132	1,26	75,354 <sup>3/</sup>	0.66	2.11
Percent of harvest		28	1	38	1	23	4	41	4	221		

<sup>1/</sup> Abbreviations used in this and following tables:

Wrb = wild rainbow (may also include some hatchery rainbow released as fingerlings)

Hyb = rainbow-cutthroat hybrids

Hrb = hatchery rainbow released as catchables

Ct = cutthroat

Eb = eastern brook

Kok = kokanee Wf =

whitefish

<sup>2/</sup> An estimated 11% (1,082) of these fish could be hatchery rainbow released as fingerlings in the fall of 1976.

<sup>3/</sup> Whitefish contributed 2.1% (1,576 fish).

Table 2. Estimated mean total length of game fish harvested by anglers from 16.7 km of the Henrys Fork of the Snake River (McCrea bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977.

Census interval	Mean total length (mm)								All game <sup>1/</sup>
	Wrb	Hyb	Hrb	Ct	Eb	Kok	Coho	Wf	
28 May - 24 Jun	245 (102)*	295 (10)	225 (117)	205 (1)	231 (101)	260 (1)	268 (2)	363 (9)	243(9.6 in.)
25 June - 22 July	243 (127)	345 (6)	225 (142)	255 (3)	222 (110)	- (0)	267 (3)	379 (6)	235(9.3 in.)
23 July - 19 Aug	243 (182)	331 (4)	233 (239)	391 (7)	198 (154)	318 (8)	315 (1)	373 (19)	235(9.3 in.)
20 Aug - 16 Sep	246 (121)	326 (5)	234 (207)	350 (4)	206 (75)	336 (51)	440 (1)	372 (15)	255(10.1 in.)
17 Sep - 30 Sep	291 (34)	- 0	236 (23)	- 0	234 (10)	340 (8)		414 (4)	281(11.1 in.)
Total <sup>2/</sup> (mm)	246	314	230	340	215	333	287	375	243
Total (in.)	9.7	12.4	9.1	13.4	8.5	13.1	11.3	14.8	9.6

<sup>1/</sup> Weighted by the estimated harvest of each species.

<sup>2/</sup> Weighted by the estimated harvest in each census interval.

\*Number of fish sampled.

Table 3. Estimated angler profile on 16.7 km of the Henrys Fork of the Snake River (McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977.

Census interval	Percent of anglers				
	Resident <sup>1/</sup>	With boat <sup>2/</sup>	Fishing_ with <sup>1/</sup>		
			Bait	Lures	Flies
28 May-24 Jun	57.0	19.4	45.4	13.3	41.3
25 Jun-22 Jul	53.3	33.6	53.2	19.0	27.8
23 Jul-19 Aug	46.5	30.7	62.8	13.1	24.1
20 Aug-16 Sep	45.5	34.9	57.1	16.3	26.6
17 Sep-30 Sep	31.6	8.3	35.3	1.2	63.5
Total	50.2	28.8	54.0	15.0	31.0

<sup>1/</sup> Interview percentages from each section weighted by angler hours per section and per interval to remove any bias from uneven interview coverage.

<sup>2/</sup> Estimated directly from angler counts.

Table 4. Estimated angler success by type of fishing gear used on 16.7 km of the Henrys Fork of the Snake River (McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977.

Census interval	Game fish			Game fish			Total game fish		
	Harvested per hour			Caught and released per hour			caught per hour		
	Bait	Lures	Flies	Bait	Lures	Flies	Bait	Lures	Flies
28 May-24 Jun	0.61	0.96	0.68	0.68	2.43	3.56	1.29	3.39	4.24
25 Jun-22 Jul	0.73	0.57	0.61	0.59	1.26	3.51	1.31	1.83	4.12
23 Jul-19 Aug	0.70	0.85	0.51	0.62	0.95	2.94	1.32	1.80	3.45
20 Aug-16 Sep	0.88	0.87	0.67	0.82	0.36	3.40	1.70	1.23	4.08
17 Sep-30 Sep	1.02	0.33	0.42	1.57	0.44	1.91	2.60	0.78	2.32
Total <sup>1</sup> /	0.75	0.79	0.60	0.69	1.00	3.20	1.44	1.79	3.80

<sup>1</sup>/ Weighted by the number of hours of fishing by each gear type in each period.

to estimate, 10% of these fish may have actually been unmarked hatchery rainbow released as fingerlings in the fall of (1976). The rest of the estimated harvest consisted of 538 (22%) hatchery rainbow catchables, 352 (15%) eastern brook trout, 133 (6%) whitefish, 112 (5%) rainbow-cutthroat hybrids, 70 (3%) cutthroat, 65 (3%) coho and 56 (2%) kokanee. Hatchery catchables made their highest contribution to the harvest in late August and early September (38%) and were least evident in late September (17%). Wild rainbow provided the smallest contribution to the harvest during the first census interval (36%) and the greatest in late July and August (48%). Kokanee did not make up more than 9% of the harvest in any one interval. Brook trout were most evident in the harvest during the early part of the season (27%) and were virtually absent after mid-August. Whitefish were generally a small portion of the harvest except for late September when they provided 42% of the estimated harvest (total harvest was very small at this time). In addition to the fish harvested, I estimated that anglers caught and released 6,379 salmonids and 754 whitefish.

The game fish harvest rate during the study period was 0.50 game fish per hour. The total catch rate (including fish caught and released) was 2.00 game fish per hour. Both of these rates are below the averages for the entire study area. The harvest rate appeared to vary considerably over the season while the total catch rate increased with each interval except the last (Table 5).

The estimated mean total length of all game fish harvested from this section was 272 mm (10.7 in). This is 29 mm (1.1 in) greater than the average for the entire study area. Whitefish had the highest mean length, 408 mm (16.1 in), while hatchery rainbow catchables had the lowest, 226 mm (8.9 in). Wild rainbow averaged 275 mm (10.8 in), rainbow-cutthroat hybrids 346 mm (13.6 in), cutthroat 377 mm (14.8 in), brook trout 244 mm (9.6 in), kokanee 335 mm (13.2 in) and coho 277 mm (10.9 in). The average size of harvested fish was smallest in late August and early September and largest in late September. Small sample sizes during these times may have biased the length estimates somewhat (Table 6).

Using the angler counts and interview data, I estimated that 62% of the anglers fishing this section were residents of Idaho. This is about 12% more than for the entire study area. Nonresident anglers outnumbered residents during the third and fifth census intervals. Sixteen percent of the anglers counted were using boats. Bait anglers accounted for 58% of the overall effort while fly fishermen accounted for 38%. Anglers using lures were uncommon except during late July and early August (Table 7).

This section receives the least fishing pressure of the five sections censused. The lower 1.6 km (1 mi) are within the storage basin of Island Park Reservoir at full pool and access by road to the middle and upper portions of the section are limited to a few jeep trails, most of which cross private lands. The best fishing in this area seems to be dependent on large rainbow and cutthroat migrating out of Island Park Reservoir in late summer.

#### Section 12-B (Coffee Pot Lodge to the Fish Trap)

During the census period we obtained angler interviews covering 597 hours of fishing in this section. This was 8.0% of the total estimated angling hours.

Table 5. Total estimated angling effort, harvest and catch rates for Section 12-A of the Henrys Fork of the Snake River (3.1 km from McCrea Bridge to Coffee Pot Lodge), 28 May to 30 September 1977.

Interval starting date	Angler hours	Harvest								Game fish		
		Wrb	Hyb	Hrb	Ct	Eb	Kok	Coho	Wf	Released	Harvested per hour	Caught per
5-28	1,109	126	32	63	0	95	32	0	0	697	0.31	0.94
6-25	1,267	376	68	86	18	205	0	52	18	1,096	0.65	1.51
7-23	1,321	321	0	205	52	52	0	13	25	2,219	0.51	2.19
8-20	632	193	12	157	0	0	24	0	24	1,915	0.65	3.68
9-17	451	66	0	27	0	0	0	0	66	1,206	0.35	3.03
Total	4,780	1,082 <sup>1/</sup>	112	538	70	352	56	65	133	7,133 <sup>2/</sup>	0.50	2.00
Percent of harvest		45	5	22	3	15	2	3	6	296		

<sup>1/</sup> About 10% of these fish may have actually been unmarked hatchery rainbow released as fingerlings in the fall of 1976.

<sup>2/</sup> Whitefish contributed 10.6% (754 fish).

Table 6. Estimated mean total length of game fish harvested by anglers from Section 12-A of the Henrys Fork of the Snake River (3.1 km from McCrea Bridge to Coffee Pot Lodge), 28 May to 30 September 1977.

Census interval	Mean total length (mm)								All game fish <sup>1/</sup>
	Wrb	Hyb	Hrb	Ct	Eb	Kok	Coho	Wf	
28 May-24 Jun	(Lengths not recorded by sub-sections during this period)								
25 Jun-22 Jul	292 (22)*	328 (4)	210 (5)	300 (1)	251 (12)	- (0)	267 (3)	- (0)	274 (10. in.)
23 Jul-19 Aug	281 (16)	- (0)	230 (13)	403 (3)	216 (4)	- (0)	315 (1)	385 (2)	274 (10. in.)
20 Aug-16 Sep	218 (6)	445 (1)	232 (5)	- (0)	- (0)	335 (2)	- (0)	- (0)	238 (9.4 in.)
17 Sep-30 Sep	320 (5)	- (0)	220 (2)	- (0)	- (0)	- (0)	- (0)	414 (4)	342 (13. in.)
Total <sup>2/</sup> (mm)	275	346	226	377	244	335	277	408	272
Total (in)	10.8	13.	8.9	14.8	9.6	13.2	10.9	16.1	10.

<sup>1/</sup> Weighted by the estimated harvest of each species.

<sup>2/</sup> Weighted by the estimated harvest in each census interval.

\*Number of fish sampled.

Table 7. Estimated angler profile on Section 12-A of the Henrys Fork of the Snake River (3.1 km from McCrea Bridge to Coffee Pot Lodge), 28 May to 30 September 1977.

Census interval	Percent of anglers				
	Resident	Fishing with			
		With boat	Bait	Lures	Flies
28 May-24 Jun	92.3	16.4	76.9	0	23.1
25 Jun-22 Jul	85.7	34.5	78.6	0	21.4
23 Jul-19 Aug	37.3	10.2	41.2	15.7	43.1
20 Aug-16 Sep	51.5	5.1	54.5	0	45.5
17 Sep-30 Sep	8.3	0	8.3	0	91.7
Total	62.0 <sup>1/</sup>	16.0	58.1 <sup>1/</sup>	4.3 <sup>1/</sup>	37.6 <sup>1/</sup>

<sup>1/</sup> Weighted by estimated angler hours per interval.



Sample sizes per interval were generally adequate for good estimates of fish harvest and size. From our angler counts, I estimated that anglers fished 7,474 hours in this section of Henrys Fork (27.0 angler hours/km/day). This was 14.4% of the total estimated angler hours occurring in the study area. Fishing pressure was especially heavy in May and June when the stonefly hatch was on and in late August and early September when the kokanee were running.

Utilizing our angler counts and interviews, I estimated that anglers harvested 3,961 game fish (1,800 game fish/km). Wild rainbow provided the single greatest contribution to the harvest with 1,761 fish or 44% of the harvest (it is unlikely that many of these fish were hatchery rainbow released as fingerling). Hatchery rainbow catchables contributed only 7% of the harvest and brook trout 14%. The rest of the harvest consisted of 965 (24%) kokanee, 185 (5%) rainbow-cutthroat hybrids, 82 (2%) whitefish, 74 (2%) cutthroat and 67 (2%) coho. Wild rainbow provided the greatest share of the harvest in late July and early August (58%) and the least in late August and early September. During this latter period, kokanee were providing 63% of the total harvest. The contribution of hatchery catchables ranged from 5% during the kokanee run to 14% in July. Brook trout were most prevalent during the opening interval (22%). In addition to the fish harvested, I estimated that anglers caught and released 13,458 salmonids and 236 whitefish.

The game fish harvest rate during the study period was 0.53 game fish per hour. The total catch rate (including fish caught and released) was 2.36 game fish per hour. The harvest rate **in** this section is considerably below that estimated for the entire study area, but the total catch rate is considerably higher. The harvest rate varied considerably throughout the season while the total catch rate was highest during the opening interval (Table 8).

The estimated mean total length of all game fish harvested from this section was 300 mm (11.8 in). This is 57 mm (2.2 in) greater than the average for the entire study area. If kokanee are not included in the estimate, the mean total length drops to about 285 mm (11.2 in). Of those species which had at least five fish sampled, cutthroat appeared to have the highest mean length, 417 mm (16.4 in). Hatchery rainbow, which averaged 245 mm (9.7 in), were the smallest. Wild rainbow averaged 270 mm (10.6 in), rainbow-cutthroat hybrids 416 mm (16.4 in), brook trout 278 mm (10.9 in), kokanee 337 mm (13.3 in) and coho 440 mm (17.3 in). The average length of harvested fish increased toward the latter part of the season (Table 9).

Using the angler counts and interview data, I estimated that 53% of the anglers fishing this section were residents of Idaho. This is slightly higher than the estimate for the entire study area. Nonresidents were most prevalent during the first and last census intervals. The rapids in this section preclude the use of boats for fishing. Bait anglers accounted for 49% of the overall fishing effort, anglers using lures accounted for 20%, and 32% of the effort was expended by fly fishermen (Table 10).

This section consists almost entirely of rapids. Many of the holes are small and difficult to fish and the swift water makes it difficult to land large fish once they are hooked. Access is by trail only, though unimproved roads come within 1 km (0.6 mi) or less of the river in at least three places.

Table 8. Total estimated angling effort, harvest and catch rates for Section 12-B of the Henrys Fork of the Snake River (2.2 km from Coffee Pot Lodge to the fish trap), 28 May to 30 September 1977.

Interval starting date	Angler hours	Harvest									Game fish	
		Wrb	Hyb	Hrb	Ct	Eb	Kok	Coh	Wf	Release	Harvested per hour	Caught per
5/28	2,233	639	112	56	0	250	0	56	0	6,545	0.50	3.43
6/25	1,159	373	20	96	0	144	0	0	58	2,145	0.60	2.45
7/23	1,772	395	30	60	51	71	51	0	19	2,328	0.38	1.70
8/20	2,119	324	23	70	23	70	894	11	0	2,450	0.67	1.82
9/17	191	30	0	0	0	10	20	0	5	226	0.34	1.52
Total	7,474	1,761 <sup>1/</sup>	185	282	74	545	965	67	82	13,694 <sup>2/</sup>	0.53	2.36
Percent of harvest		44	5	7	2	14	24	2	2	346		

<sup>1/</sup> About 1-2% of these fish may have actually been unmarked hatchery rainbow released as fingerlings in the fall of 1976.

<sup>2/</sup> White fish contributed 1.7% (236 fish).

Table 9. Estimated mean total length of game fish harvested by anglers from Section 12-B of the Henrys Fork of the Snake River (2.2 km from Coffee Pot Lodge to the fish trap), 28 May to 30 September 1977.

Census interval	Mean total length (mm)								All game <sup>1/</sup>
	Wrb	Hyb	Hr	Ct	Eb	Kok	Coho	Wf	
28 May-24 June	(Lengths not recorded by sub-sections during this period)								
25 June-22 Jul	264 (30) *	380 (2)	243 (8)	- (0)	282 (10)	- (0)	- (0)	- (0)	269 (10.6 in)
23 Jul-19 Aug	259 (32)	455 (2)	246 (7)	417 (3)	295 (1)	340 (3)	- (0)	- (0)	289 (11.4 in)
20 Aug-16 Sep	286 (22)	343 (2)	248 (6)	418 (2)	245 (6)	337 (25)	440 (1)	- (0)	319 (12.5 in)
17 Sept-30 Sep	302 (5)	- (0)	- (0)	- (0)	328 (2)	339 (4)	- (0)	- (0)	319 (12.5 in)
Total <sup>2/</sup> (mm)	270	416	245	417	278	337	440	-	300
Total (in)	10.6	16.4	9.7	16.4	10.9	13.3	17.3	-	11.8

<sup>1/</sup> Weighted by the estimated harvest of each species.

<sup>2/</sup> Weighted by the estimated harvest in each census interval.

\* Number of fish sampled.

Table 10. Estimated angler profile on Section 12-B of the Henrys Fork of the Snake River (2.2 km from Coffee Pot Lodge to the fish trap), 28 May to 30 September 1977.

Census interval	Percent of anglers				
	Resident	With boat	Fishing with		
			Bait	Lures	Flies
28 May-24 Jun	42.9	0	39.3	10.7	50.0
25 Jun-22 Jul	69.4	0	72.6	12.9	14.5
23 Jul-19 Aug	54.7	0	60.0	13.3	26.7
20 Aug-16 Sep	53.7	0	35.4	39.0	25.6
17 Sep-30 Sep	47.6	0	57.1	9.5	33.3
Total	53.0 <sup>1/</sup>	0	48.7 <sup>1/</sup>	19.7 <sup>1/</sup>	31.6 <sup>1/</sup>

<sup>1/</sup> Weighted by estimated angler hours per interval.



This section of the Henrys Fork is broad, relatively shallow and flat. It is confined to a single channel (except in one place) by moderately rising banks closely bordering most of the stream. Few deep pools are found in this stretch. The banks are not undercut and do not provide much in the way of overhanging vegetative cover. The few large fish caught in this section appear to be spawners on their way to and from the spawning grounds near Big Springs.

#### Section 13-A (Macks Inn Bridge to the North Fork Club)

During the census period we obtained angler interviews covering 615 hours of fishing in this section. This was 5.7% of the total estimated angling hours. Sample sizes per interval were generally adequate for good estimates of fish harvest and size.

From our angler counts, I estimated that anglers fished 10,836 hours in this section of Henrys Fork (41.0 angler hours/km/day). This was 20.9% of the total estimated angler hours occurring in the study area. Fishing pressure was uniformly heavy from the opening interval until late August.

Utilizing our angler counts and interviews, I estimated that anglers harvested 9,070 game fish (4,319 game fish/km). Hatchery rainbow provided the single greatest contribution to the fishery with 5,900 fish or 65.0% of the harvest. Wild rainbow provided only about 14% of the harvest and brook trout 12%. The rest of the harvest consisted of 323 (4%) whitefish, about 300 (3%) hatchery rainbow released as fingerlings, 127 (1%) kokanee, 18 (0.2%) cutthroat, and 13 (0.1%) rainbow-cutthroat hybrids. Wild rainbow provided their greatest share of the harvest during the opening interval (24%) and declined thereafter until mid-September. The contribution of hatchery catchables ranged from 70% in July to 45% after mid-September. Brook trout were most prevalent from late July to mid-September (16%). Kokanee provided 18% of the harvest after mid-September. In addition to the fish harvested, I estimated that anglers caught and released 17,030 salmonids and 109 whitefish.

The game fish harvest rate during the study period was 0.84 game fish per hour. The total catch rate (including fish caught and released) was 2.42 game fish per hour. The harvest rate for this section was the highest of any section in the study area and the total catch rate was considerably above that estimated for the entire census. The harvest rate was lowest at mid-season and highest in the final interval. The total catch rate followed a similar pattern except that it was highest during the opening interval (Table 14). The estimated mean total length of all game fish harvested from this section was 229 mm (9.0 in). This is 14 mm (0.6 in) less than the average for the entire study area. Whitefish appeared to have the greatest mean length, 356 mm (14.0 in) and brook trout were the smallest at 202 mm (7.9 in). Wild rainbow averaged 223 mm (8.8 in), rainbow-cutthroat hybrids 320 mm (12.6 in), hatchery rainbow 229 mm (9.0 in), cutthroat 215 mm (8.5 in), and kokanee 349 mm (13.7 in). The average length of harvested fish was smallest in mid-season and greatest after mid-September (Table 15).

Using the angler counts and interview data, I estimated that 47% of the anglers fishing this section were residents of Idaho. This is about 3% less than the estimate for the entire study area. Nonresidents were most prevalent from late July to early September. Anglers fishing from boats accounted for

Table 10. Estimated angler profile on Section 12-B of the Henrys Fork of the Snake River (2.2 km from Coffee Pot Lodge to the fish trap), 28 May to 30 September 1977.

Census interval	Percent of anglers				
	Resident	With boat	Fishing with		
			Bait	Lures	Flies
28 May-24 Jun	42.9	0	39.3	10.7	50.0
25 Jun-22 Jul	69.4	0	72.6	12.9	14.5
23 Jul-19 Aug	54.7	0	60.0	13.3	26.7
20 Aug-16 Sep	53.7	0	35.4	39.0	25.6
17 Sep-30 Sep	47.6	0	57.1	9.5	33.3
Total	53.01 <sup>1/</sup>	0	48.71 <sup>1/</sup>	19.71 <sup>1/</sup>	31.6 <sup>1/</sup>

1/ Weighted by estimated angler hours per interval.

This section provides the largest average size of game fish of the entire study area and has an intensive kokanee fishery in late summer.

#### Section 12-C (Fish Trap to Macks Inn Bridge)

During the census period we obtained angler interviews covering 702 hours of fishing in this section. This was 5.7% of the total estimated angling hours. Sample sizes per interval were generally adequate for good estimates of fish harvest and size.

From our angler counts, I estimated that anglers fished 12,310 hours in this section of Henrys Fork (21.2 angler hours/km/day). This was 23.7% of the total estimated angler hours occurring in the study area. Fishing pressure was much heavier from late June to mid-August than any other time.

Utilizing our angler counts and interviews, I estimated that anglers harvested 10,060 game fish (2,187 game fish/km). Hatchery catchables provided the single greatest contribution to the harvest with 4,716 fish or 47% of the harvest. Wild rainbow contributed about 24% of the harvest and brook trout 23%. The rest of the harvest consisted of about 300 (3%) hatchery rainbow planted as fingerlings, 227 (2%) whitefish, 67% (0.7%) rainbow-cutthroat hybrids, 25 (0.2%) cutthroat and 14 (0.1%) kokanee. Wild rainbow provided their greatest share of the harvest during the final interval (44%) and were least evident in late August and early September (16%). The contribution of hatchery catchables ranged from 33% during the opening interval to 64% in late August and early September. Brook trout were most prevalent during late July and early August (31%). In addition to the fish harvested, I estimated that anglers caught and released 25,257 salmonids and 93 whitefish.

The game fish harvest rate during the study period was 0.82 fish per hour. The total catch rate (including fish caught and released) was 2.88 game fish per hour. Both rates are considerably above those estimated for the entire census area. The harvest rate generally increased as the season progressed while the total catch rate was lowest near mid-season (Table 11).

The estimated mean total length of all game fish harvested from this section was 2.6 mm (8.5 in). This is 27 mm (1.1 in) less than the average for the entire study area and the smallest mean length of any section. Cutthroat appeared to have the greatest mean length, 395 mm (15.6 in). However, only one cutthroat was sampled. Hatchery rainbow had the greatest mean length of any species for which sufficient sample numbers were obtained, 299 mm (9.0 in). Wild rainbow averaged 219 mm (8.6 in), rainbow-cutthroat hybrids 180 mm (7.1 in), brook trout 183 mm (7.2 in), and kokanee 320 mm (12.6 in). The average length of harvested fish increased with each interval (Table 12).

Using the angler counts and interview data, I estimated that 49% of the anglers fishing this section were residents of Idaho. This is slightly less than the estimate for the entire study area. Nonresidents were most prevalent during September. Six percent of the anglers fished from boats. Fly fishing was the dominant angling method in this section, accounting for 43% of the effort. Anglers using bait and lures accounted for 40% and 17%, respectively. This was the only section in the study area in which bait anglers did not comprise the largest single user group (Table 13).



Table 11. Total estimated angling effort, harvest and catch rates for Section 12-C of the Henrys Fork of the Snake River (4.6 km from the fish trap to Macks Inn Bridge), 28 May to 30 September 1977.

Interval starting date	Angler hours	Harvest								Game fish		
		Wrb	Hy	Hrb	Ct	Eb	Ko	Coho	Wf	Released	Harvested per hour	Caught per hour
5-28	2,916	714	52	627	0	261	0	0	227	7,103	0.65	3.08
6-25	3,700	921	0	1,443	0	766	0	0	0	8,166	0.85	3.05
7-23	3,570	639	0	1,349	14	907	14	0	0	5,298	0.82	2.30
8-20	1,821	308	15	1,167	0	322	0	0	0	4,134	1.00	3.27
9-17	303	141	0	130	11	32	0	0	0	649	1.04	3.18
Total	12,310	2,723 <sup>1/</sup>	67	4,716	25	2,288	14	0	227	25,350 <sup>2/</sup>	0.82	2.88
Percent of harvest		27	1	47	<1	23	.1	0	2	252		

<sup>1/</sup> About 10-15% of these fish may have actually been unmarked hatchery rainbow released as fingerlings in the fall of 1976.

<sup>2/</sup> Whitefish contributed 0.4% (93 fish).

Table 12. Estimated mean total length of game fish harvest by anglers from Section 12-C of the Henrys Fork of the Snake River (4.6 km from the fish trap to Macks Inn Bridge), 28 May to 30 September 1977.

Census interval	Mean total length (mm)								All game fish <sup>1/</sup>
	Wrb	Hyb	Hrb	Ct	Eb	Kok	Coho	Wf	
28 May-24 June	(Lengths not recorded by sub-sections during this period)								
25 June-22 Jul	206 (29)*	- (0)	217 (43)	- (0)	187 (23)	- (0)	- (0)	- (0)	206 (8.1 in)
23 Jul-19 Aug	218 (48)	- (0)	237 (94)	395 (1)	178 (55)	320 (1)	- (0)	- (0)	216 (8.5 in)
20 Aug-16 Sept	226 (19)	180 (1)	234 (74)	- (0)	186 (17)	- (0)	- (0)	- (0)	224 (8.8 in)
17 Sept-30 Sep	299 (13)	- (0)	240 (13)	- (0)	220 (1)	- (0)	- (0)	- (0)	265 (10.5 in)
Total <sup>2/</sup> (mm)	219	180	229	395	183	320	-	-	216
Total (in)	8.6	7.1	9.0	15.6	7.2	12.6	-	-	8.5

<sup>1/</sup> Weighted by the estimated harvest of each species.

<sup>2/</sup> Weighted by the estimated harvest in each census interval. \*

Number of fish sampled.

Table 13. Estimated angler profile on Section 12-C of the Henrys Fork of the Snake River (4.6 km from the fish trap to Macks Inn Bridge), 28 May to 30 September 1977.

Census interval	Percent of anglers				
	Resident	With boat	Fishing with		
			Bait	Lures	Flies
28 May-24 Jun	54.7	8.2	22.7	10.7	66.7
25 Jun-22 Jul	48.4	3.7	39.6	24.2	36.3
23 Jul-19 Aug	47.1	9.3	54.3	18.6	27.1
20 Aug-16 Sep	45.5	1.0	40.3	10.4	49.4
17 Sep-30Sep	23.5	0.0	41.2	0.0	58.8
Total	48.5 <sup>1/</sup>	6.0	40.0 <sup>1/</sup>	16.7 <sup>1/</sup>	43.3 <sup>1/</sup>

<sup>1/</sup> Weighted by estimated angler hours per interval.

This section of the Henrys Fork is broad, relatively shallow and flat. It is confined to a single channel (except in one place) by moderately rising banks closely bordering most of the stream. Few deep pools are found in this stretch. The banks are not undercut and do not provide much in the way of overhanging vegetative cover. The few large fish caught in this section appear to be spawners on their way to and from the spawning grounds near Big Springs.

#### Section 13-A (Macks Inn Bridge to the North Fork Club)

During the census period we obtained angler interviews covering 615 hours of fishing in this section. This was 5.7% of the total estimated angling hours. Sample sizes per interval were generally adequate for good estimates of fish harvest and size.

From our angler counts, I estimated that anglers fished 10,836 hours in this section of Henrys Fork (41.0 angler hours/km/day). This was 20.9% of the total estimated angler hours occurring in the study area. Fishing pressure was uniformly heavy from the opening interval until late August.

Utilizing our angler counts and interviews, I estimated that anglers harvested 9,070 game fish (4,319 game fish/km). Hatchery rainbow provided the single greatest contribution to the fishery with 5,900 fish or 65.0% of the harvest. Wild rainbow provided only about 14% of the harvest and brook trout 12%. The rest of the harvest consisted of 323 (4%) whitefish, about 300 (3%) hatchery rainbow released as fingerlings, 127 (1%) kokanee, 18 (0.2%) cutthroat, and 13 (0.1%) rainbow-cutthroat hybrids. Wild rainbow provided their greatest share of the harvest during the opening interval (24%) and declined thereafter until mid-September. The contribution of hatchery catchables ranged from 70% in July to 45% after mid-September. Brook trout were most prevalent from late July to mid-September (16%). Kokanee provided 18% of the harvest after mid-September. In addition to the fish harvested, I estimated that anglers caught and released 17,030 salmonids and 109 whitefish.

The game fish harvest rate during the study period was 0.84 game fish per hour. The total catch rate (including fish caught and released) was 2.42 game fish per hour. The harvest rate for this section was the highest of any section in the study area and the total catch rate was considerably above that estimated for the entire census. The harvest rate was lowest at mid-season and highest in the final interval. The total catch rate followed a similar pattern except that it was highest during the opening interval (Table 14). The estimated mean total length of all game fish harvested from this section was 229 mm (9.0 in). This is 14 mm (0.6 in) less than the average for the entire study area. Whitefish appeared to have the greatest mean length, 356 mm (14.0 in) and brook trout were the smallest at 202 mm (7.9 in). Wild rainbow averaged 223 mm (8.8 in), rainbow-cutthroat hybrids 320 mm (12.6 in), hatchery rainbow 229 mm (9.0 in), cutthroat 215 mm (8.5 in), and kokanee 349 mm (13.7 in). The average length of harvested fish was smallest in mid-season and greatest after mid-September (Table 15).

Using the angler counts and interview data, I estimated that 47% of the anglers fishing this section were residents of Idaho. This is about 3% less than the estimate for the entire study area. Nonresidents were most prevalent from late July to early September. Anglers fishing from boats accounted for

Table 14. Total estimated angling effort, harvest and catch rates for Section 13-A of the Henrys Fork of the Snake River (2.1 km from Macks Inn Bridge to the North Fork Club), 22 May to 30 September 1977.

Interval starting date	Angler hours	Harvest								Game fish		
		Wrb	Hy	Hrb	Ct	Eb	Kok	Coho	Wf	Released	Harvested per hour	Caught per hour
5-28	2,877	630	0	1,605	0	173	0	0	173	8,274	0.90	3.77
6-25	3,045	438	0	1,660	18	268	0	0	0	3,952	0.78	2.08
7-23	2,816	265	0	1,183	0	282	0	0	0	2,526	0.61	1.51
8-20	1,786	157	13	1,202	0	289	23	0	109	1,888	1.00	2.06
9-17	312	104	0	250	0	83	104	0	41	499	1.87	3.46
Total	10,836	1,594 <sup>1/</sup>	13	5,900	18	1,095	127	0	323	17,139 <sup>2/</sup>	0.84	2.42
Percent of harvest		18	41	65	C1	12	1	0	4	189		

<sup>1/</sup> About 15-20% of these fish may have been hatchery rainbow released as fingerlings in the fall of 1976.

<sup>2/</sup> Whitefish contributed 0.6% (109 fish).

Table 15. Estimated mean total length of game fish harvested by anglers from Section 13-A of the Henrys Fork of the Snake River (2.1 km from Macks Inn Bridge to the North Fork Club), 28 May to 30 September 1977.

Census interval	Mean total length (mm)								All game fish <sup>y</sup>
	Wrb	Hyb	Hrb	Ct	Eb	Kok	Coho	Wf	
28 May-24 June	(Lengths not recorded by sub-sections during this period)								
25 June-22 Jul	209 (22)*	- (0)	229 (74)	215 (1)	206 (9)	- (0)	- (0)	- (0)	223 (8.8 in)
23 Jul-19 Aug	218 (19)	- (0)	224 (62)	- (0)	192 (9)	- (0)	- (0)	- (0)	218 (8.6 in)
20 Aug-16 Sept	244 (12)	320 (1)	232 (97)	- (0)	206 (21)	385 (2)	- (0)	356 (9)	239 (9.4 in)
17 Sep-30 Sep	256 (4)	- (0)	233 (8)	- (0)	205 (3)	341 (4)	- (0)	- (0)	254 (10.0 in)
Total <sup>1</sup> / (mm)	223	320	229	215	202	349	-	356	229
Total (in)	8.8	12.6	9.0	8.5	7.9	13.7	-	14.0	9.0

<sup>1</sup>/ Weighted by the estimated harvest of each species.

<sup>2</sup>/ Weighted by the estimated harvest in each census interval. \*

Number of fish sampled.

35% of the angler effort. Anglers using bait dominated the fishing methods (59%). Fly fishermen accounted for 26% of the effort and 15% was credited to anglers fishing with lures. Fly fishing was most prevalent during the early intervals and bait fishing during the middle and latter periods (Table 16).

This section of Henrys Fork is flat and shallow with some willowed islands and private summer homes and motels lining both sides of the stream. It receives the heaviest fishing pressure per kilometer of any censused section and also has the highest harvest rate. Hatchery rainbow provide the bulk of the harvest. Even with intense pressure, the average size of wild rainbow and brook trout harvested here appears to exceed that of Section 12-C.

#### Section 13-B (North Fork Club to Railroad Trestle below Big Springs)

During the census period we obtained angler interviews covering 1,045.5 hours of fishing in this section. This was 6.3% of the total estimated angling hours. Sample sizes per interval were generally adequate for good estimates of fish harvest and size.

From our angler counts, I estimated that anglers fished 16,499 hours in this section of Henrys Fork (27.9 angler hours/km/day). This was 31.8% of the total estimated angler hours occurring in the study area. Fishing pressure was heaviest from late June to late July.

Utilizing our angler counts and interviews, I estimated that anglers harvested 8,628 game fish (1,836 game fish/km). Brook trout provided the single greatest contribution to the fishery with 3,692 fish or 43% of the harvest. Wild rainbow provided about 25% of the harvest and hatchery rainbow 17%. The rest of the harvest consisted of 451 (5%) whitefish, 373 (4%) kokanee, about 300 (3%) hatchery rainbow released as fingerlings, 118 (1%) cutthroat and 45 (0.5%) rainbow-cutthroat hybrids. Wild rainbow were least evident in the harvest during the opening interval (19%) and increased with each interval until they provided about 61% of the harvest after mid-September. Brook trout followed the opposite pattern, providing 70% of the harvest during the opening interval and decreasing to 24% in late August and early September. No hatchery rainbow were sampled during the final interval. They were most prevalent in mid-season when they provided 26% of the harvest. Kokanee provided 15% of the harvest in late August and early September. In addition to the fish harvested, I estimated that anglers caught and released 11,654 salmonids and 384 whitefish.

The game fish harvest rate during the study period was 0.52 game fish per hour. The total catch rate (including fish caught and released) was 1.25 game fish per hour. Both of these rates were substantially below the average for the entire study area, and the total catch rate was the lowest of any section. The harvest rate was highest during mid-season at the same time that the total catch rate was lowest (Table 17).

The estimated mean total length of all game fish harvested from this section was 246 mm (9.7 in). This is 3 mm (0.1 in) greater than the average for the entire study area. Whitefish had the greatest mean length, 370 mm (14.6 in) and hybrids and brook trout had the smallest (208 and 215 mm, respectively). Wild

Table 16. Estimated angler profile on Section 13-A of the Henrys Fork of the Snake River (2.1 km from Macks Inn Bridge to the North Fork Club), 28 May to 30 September 1977.

Census interval	Percent of anglers				
	Resident	With boat	Bait	Fishing with Lures	Flies
28 May-24 Jun	59.3	40.0	42.4	16.9	40.7
25 Jun-22 Jul	48.8	32.6	54.7	16.3	29.1
23 Jul-19 Aug	36.6	39.1	72.3	15.2	12.5
20 Aug-16 Sep	37.1	30.9	68.0	13.4	18.6
17 Sep-30 Sep	76.9	0	76.9	0	23.1
Total	47.3 <sup>1/</sup>	35.3	58.8 <sup>1/</sup>	15.2 <sup>1/</sup>	26.0 <sup>1/</sup>

<sup>1/</sup> Weighted by estimated angler hours per interval.



Table 17. Total estimated angling effort, harvest and catch rates for Section 13-B of the Henrys Fork of the Snake River (4.7 km from North Fork Club to the railroad trestle below Big Springs), 28 May to 30 September 1977.

N

Interval starting date		Harvest								Game fish		
		Wrb	Hyb	Hrb	Ct	Eb	Kok	Coho	Wf	Harvested	Caught	
5-28	3,526	286	25	120	25	1,044	0	0	0	3,325	0.43	1.37
5-25	4,801	495	0	326	19	1,210	0	0	182	3,365	0.46	1.17
7-23	3,996	755	20	659	32	871	44	0	180	2,042	0.64	1.15
8-20	3,873	848	0	372	31	523	329	0	89	3,009	0.57	1.34
9-17	303	88	0	0	11	44	0	0	0	297	0.47	1.45
Total	16,499	2,472 <sup>1/</sup>	45	1,477	118	3,692	373	0	451	12,038 <sup>2/</sup>	0.52	1.25
Percent of harvest		29	1	17	1	43	4	0	5	140		

<sup>1/</sup> About 10-15% of these fish may have been hatchery rainbow released as fingerlings in the fall of 1976.

<sup>2/</sup> Whitefish contributed 3.2% (384 fish).

rainbow averaged 248 mm (9.8 in), hatchery rainbow 233 mm (9.2 in), cutthroat 290 mm (11.4 in) and kokanee 328 mm (12.9 in). The average length of harvested fish increased each interval except the last (Table 18).

Using the angler counts and interview data, I estimated the 49% of the anglers fishing this section were residents of Idaho. This is slightly less than the estimate for the entire study area. Nonresidents were most prevalent during the last two census intervals. This section has the heaviest boat usage in the study area and 60% of the anglers were fishing from boats. Bait was the most popular fishing method (63%). Fly fishermen accounted for 23% of the angler effort and anglers using lures (14%) (Table 19).

This section of Henrys Fork has a low gradient, meanders, and is braided through swampy terrain. The uppermost portion is shallow with a gravel bottom while the rest has a sandy, silty bottom with several deep pools. Small brook trout abound in the shallow upper portion while larger rainbow, brook trout and whitefish inhabit the deeper pools. This is the second most intensely fished section in the study area. It does not receive as much hatchery support as 13-A and has a much lower catch rate, but the average size of fish harvested is greater than either 12-C or 13-A.

#### Angler Questionnaire

Over the census period we recorded the responses of 522 anglers to a questionnaire about their fishing experience and preferences for the fishery in the study area. The results showed that 42% of the anglers interviewed rated the fishing at "good" or better. The response was nearly identical for anglers fishing above or below Macks Inn bridge. A lack of large fish was the dominant reason for a "fair or poor" rating of the fishery. Below Macks Inn (Section 12) there was considerable sentiment toward further restrictions to help improve the fishing (47%). A gear restriction such as "fly fishing only" was the preferred method (45%). However, above Macks Inn a majority (52%) favored no further restrictions. A majority of anglers were against allowing people to fish from a boat with motor attached (88% below Macks Inn and 63% above). However, our cross-section of interviews may have been biased somewhat, especially during the early part of the season, as a printed regulation prohibiting fishing from boats with motors was later rescinded for the area above Macks Inn (Table 20)

#### Age and Growth of Wild Fish

From the body length-anterior scale radius relationship, I estimated that wild rainbow in the study area reach a mean total length of 111 mm (4.4 in) at the end of their first year of life, 217 mm (8.5 in) by the second, 322 mm (12.7 in) by the third and 391 mm (15.4 in) by the end of the fourth year (Table 21). Brook trout grew more slowly and no fish over 3 years of age were sampled. By the end of the third year the mean estimated length of brook trout was 300 mm (11.8 in) (Table 22).

The mean total length of three age four whitefish sampled in August was 387 mm (15.2 in). One 5-year old whitefish sampled in August was 450 mm (17.7 in) in length.

Table 18. Estimated mean total length of game fish harvested by anglers from Section 13-B of the Henrys Fork of the Snake River (4.7 km from Macks Inn Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977.

Census interval	Mean total length (mm)								
	Wrb	Hyb	Hrb	Ct	Eb	Kok	Coho	Wf	All game fish <sup>y</sup>
28 May-24 June	(Lengths not recorded by sub-sections during this period)								
25 Jun-22 Jul	249 (24)*	- (0)	223 (12)	250 (1)	222 (56)	- (0)	- (0)	356 (6)	239 (9.4 in)
23 Jul-19 Aug	252 (67)	208 (2)	236 (63)	363 (3)	209 (85)	301 (4)	- (0)	371 (17)	244 (9.6 in)
20 Aug-16 Sep	241 (62)	- (0)	238 (25)	283 (2)	210 (31)	332 (22)	- (0)	396 (6)	254 (10.0 in)
17 Sep-30 Sep	269 (7)	- (0)	- (0)	- (0)	213 (4)	- (0)	- (0)	- (0)	250 (9.9 in)
Total? <sup>1/</sup> (mm)	248	208	233	290	215	328	-	370	246
Total (in)	9.8	8.2	9.2	11.4	8.5	12.9	-	14.6	9.7

<sup>1/</sup> Weighted by the estimated harvest of each species.

<sup>2/</sup> Weighted by the estimated harvest in each census interval.

\* Number of fish sampled.

Table 19. Estimated angler profile on Section 13-B of the Henrys Fork of the Snake River (4.7 km from Macks Inn Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977.

Census interval	Percent of anglers				
	Resident	With boat	Bait	Fishing with Lures	Flies
28 May-24 Jun	54.9	27.3	60.6	18.3	21.1
25 Jun-22 Jul	47.4	67.5	51.6	23.2	25.3
23 Jul-19 Aug	52.4	68.6	72.2	5.6	22.2
20 Aug-16 Sep	43.8	76.1	72.3	10.7	17.0
17 Sep-30 Sep	17.4	38.5	13.0	0	87.0
Total	48.8 <sup>1/</sup>	60.4	62.7 <sup>1/</sup>	14.5 <sup>1/</sup>	22.8 <sup>1/</sup>

<sup>1/</sup> Weighted by estimated angler hours per interval.

Table 20. Summary of Henrys Fork Questionnaire as presented to anglers on Sections 12 and 13 of the Henrys Fork of the Snake River (16.7 km from McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977.

1. How do you rate fishing on this section of Henrys Fork this year?

	No. sampled	Excellent	Good	Fair	Poor	No opinion
Section 12	212	9	34	32	21	4
Section 13	310	11	31	35	18	5

1-A. If "fair or poor" - reason?

	No. sampled	Size	Abundance	Size and abundance	Other
Section 12	112	61	10	14	15
Section 13	164	40	10	18	32

2. Would you be in favor of further limit, size or gear restrictions to improve the quality of this fishery?

	No. sampled	Yes	No	No opinion
Section 12	212	47	43	10
Section 13	310	29	52	19

2-A. If more restrictions are desired - preferred type of restriction?

	No. sampled	Gear	Size	Limit	Other
Section 12	100	45	25	22	8
Section 13	89	53	20	15	12

3. Do you favor allowing people to fish from a boat with motor attached in this section?

	No. sampled	Yes	No	No opinion
Section 12	212	8	88	4
Section 13	310	28	63	9

Table 21. Calculated mean total lengths and annual increments of growth for wild rainbow samples from angler creels on the Henrys Fork of the Snake River (16.7 km from McCrea Bridge to railroad trestle below Big Springs), 28 May to 30 September 1977.

Age class	Number of fish	Mean TL at capture (mm)	Calculated mean total length (mm) at annulus					
			1	2	3	4	5	6
	10	183	113					
II	8	277	107	217				
III	8	403	117	227	338			
IV	2	433	95	198	270	391		
VI	1	610	<u>103</u>	<u>180</u>	<u>301</u>	<u>391</u>	<u>488</u>	<u>546</u>
Weighted mean length			111	217	322	391	488	546
Increment of growth			111	106	105	69	97	58
Number of fish			29	19	11	3	1	1



Table 22. Calculated mean total lengths and annual increments of growth for brook trout sampled from angler creels on the Henrys Fork of the Snake River (16.7 km from McCrea Bridge to the railroad trestle below Big Springs), 28 May to 30 September 1977.

Age class	Number of fish	Mean TL at capture (mm)	Calculated mean total length (mm) at annulus		
			1	2	3
I	12	169	92		
II	15	231	90	184	
III	7	359	<u>75</u>	<u>180</u>	<u>300</u>
Weighted mean length			88	183	300
Increment of growth			88	95	117
Number of fish			34	22	7



### Hatchery Returns

I estimated that 32% of the hatchery rainbow catchables released into the study area in 1977 were harvested by anglers during the census period. Since hatchery fish do move both up and downstream from the release sites and since several releases were distributed in more than one section, the return percentages for individual sections are very approximate. None of the hatchery fish were intentionally marked; however, most were readily identifiable. Any bias in the estimates would be toward underestimating the total return (Table 23).

During the 1977 census, we did not find any of the 25,900 adipose clipped hatchery rainbow released as fingerling in this area in the fall of 1975. The remaining fish either moved downstream into Island Park Reservoir or did not survive their second winter.

### Nongame Fish

Anglers reported catching very few nongame fish in upper Henrys Fork. Utah chubs were fairly common in Section 12-A to the foot of Coffee Pot rapids. Above the rapids we found two chubs in the anglers' creels in Section 13-A. They were 280 and 255 mm (11.0 and 10.0 in) in length. Anglers in this section also reported catching three other chubs during the census.

## DISCUSSION

Inherent in any evaluation of fishing quality is the fact that each angler has his own opinion as to what constitutes quality. For the purpose of this report, I will consider only catch rate, fish size and fishing pressure (as an aesthetic consideration) as vital to an anglers fishing experience on the Henrys Fork. The rainbow and brook trout which dominate the fishery are generally considered high quality game fish and major changes in the game fish composition will not be considered in this discussion.

In general, catch rates in excess of 1.00 game fish per hour indicate good to excellent fishing. However, the effect of fish size can greatly influence the acceptable limits of catch rate. Individual fishermen vary greatly in their response to these two variables and to set the exact combination that makes a high quality fishery is always arbitrary. However, as a rule, the present user group on upper Henrys Fork would probably rate a fishery which provides a catch rate equal to or greater than 1.00 game fish per hour with 30% or more of the fish exceeding 305 mm (12.0 in) as a very good fishery. I present these parameters not as the ultimate in a quality fishery, but rather as a bench mark from which to judge the present Henrys Fork fishery.

### Comparative Fishing Quality of the Census Sections

Our creel census reveals that in certain stream sections during specific periods of the season the fishing quality of upper Henrys Fork is extremely high. In general, Sections 12-A, 12-B and 13-B provide quality fishing during the earliest part of the season and again toward the end of summer. This quality is measured not only by a high catch rate, but also by the opportunity to catch

Table 23. Estimated return to the creel of hatchery rainbow trout released as "catchables" in the Henrys Fork of the Snake River (16.7 km from McCrea Bridge to the railroad trestle below Big Springs), 2 May to 30 September 1977.

Stream section	Number released	Estimated harvest	Percent return
12-A	5,550	538	10
12-B	0	282	-
12-C	18,350	4,716	26
12-All	23,900	5,536	23
13-A	11,900	5,900	50
13-B	4,250	1,477	35
13-All	<u>16,150</u>	<u>7,377</u>	<u>46</u>
Grand total	40,050	12,913	32

fish well over 400 mm (15.8 in) in length. Most of these large fish are apparently involved in a migratory movement and do not reside year-round in the study area. Large fish caught in the spring are generally post spawners and are moving downstream toward Island Park Reservoir. In response to lowering water levels, warming water temperatures, spawning urges or other inherent behavior, these large rainbow begin moving upstream out of the reservoir in mid to late summer. In between these movements and in those areas which do not have adequate holding water for large fish, the fishing quality declined significantly.

None of the sections in the study area suffer from a low total catch rate. The rates ranged from 0.94-3.77 game fish per hour per census interval. Small rainbow (wild and hatchery) and brook trout can be readily caught at nearly any time or place. However, the low mean length of trout and low percentage of the harvest over 305 mm (12.0 in) in most sections, especially during mid-summer, are the primary causes for angler dissatisfaction with the quality of the fishery.

Per kilometer, Section 13-A (Macks Inn Bridge to the North Fork Club) receives by far the greatest angling pressure. The estimated 5,160 angler hours/km in this section is almost 1.5 times that of the next highest section (13-B). Fishing in this section is primarily with bait and lures. It provides fishing for the largest number of nonresident and juvenile fishermen of any other section and many of these anglers are novice or "casual" fishermen. In this type of fishery, quality tends to be equated more with catch rate (of suitable game species) rather than larger fish size. With heavy hatchery support, Section 13-A is currently providing the highest harvest rate and second highest catch rate within the study area (0.84 and 2.42 game fish per hour, respectively). However, the average size of fish harvested is the second lowest and only 4% of the wild rainbow and brook trout harvested were 305 mm (12.0 in) or longer (Tables 24, 25 and 26).

Section 12-C (fish trap to Macks Inn Bridge) provides a similar fishing quality to Section 13-A. The fishing pressure over the entire section is less intensive (2,676 angler hours/km), but the average harvest and catch rates and size of fish are similar. This section also provides angling for a great deal of nonresident fishermen and it has the highest fly fishing usage of any section in the study area (43%). Most of these fly fishermen are serious anglers who do a lot of catch-and-release fishing and are more interested in hooking a few large fish than constantly shaking off small ones. Consequently, despite the highest catch rate in the study area (2.88 game fish per hour), this section generally receives a low quality rating because only 4% of the fish harvested are over 305 mm (12.0 in) in length and the average size of fish caught is less than 216 mm (8.5 in). Nearly all of the larger fish were caught as they moved through the area in the fall. There is little deep holding water or cover to induce them to stay within the area. While Section 12-C receives substantial hatchery support, the value of this support in satisfying the fishermen is minimal as the hatchery catchables average only slightly larger than the wild rainbow and less than 0.5% of them ever enter the harvest at lengths greater than 305 mm (12.0 in) (Tables 24, 25 and 26).

Section 13-B (North Fork Club to the railroad trestle below Big Springs)

Table 24. Comparison of total estimated angling effort, harvest and catch rates for Sections 12 and 13 of the Henrys Fork of the Snake River, 28 May to 30 September 1977.

Stream section	Angler hrs/km	Harvest per kilometer								Total game fish		
		Wrb	Hyb	Hrb	Ct	Eh	Salmon	Wf	Total	Released per km	Harvested per hour	Caught per hour
12-A	1,542	349	36	174	23	114	39	43	777	2,301	0.50	2.00
12-B	3,397	800	84	128	34	248	469	37	1,800	6,225	0.53	2.36
12-C	2,676	592	15	1,025	5	497	3	49	2,187	5,511	0.82	2.88
12-All	2,481	562	37	559	17	322	118	45	1,659	4,664	0.67	2.55
13-A	5,160	759	6	2,810	9	521	60	154	4,319	8,161	0.84	2.42
13-B	3,510	526	10	314	25	786	79	96	1,836	2,561	0.52	1.25
13-All	4,020	598	9	1,085	20	704	74	114	2,603	4,291	0.65	1.71

Table 25. Comparison of the estimated mean total length of game fish harvested by anglers from Sections 12 and 13 of the Henrys Fork of the Snake River, 28 May to 30 September 1977.

Stream section	Mean total length (mm)								All game fish
	Wrb	Hyb	Hrb	Ct	Eb	Kok	Coho	Wf	
12-A	275	346	226	377	244	335	277	408	272 (10.7 in)
12-B	270	416	245	417	278	337	440	-	300 (11.8 in)
12-C	219	180	229	395	183	320	-	-	216 (8.5 in)
12-All	246	351	230	397	206	332	360	408	244 (9.6 in)
13-A	223	320	229	215	202	349	-	356	229 (9.0 in)
13-B	248	208	233	290	215	328	-	370	246 (9.7 in)
13-All	238	233	230	280	212	333	-	364	237 (9.3 in)

Table 26. Comparison of estimated angler profiles for Sections 12 and 13 of the Henrys Fork of the Snake River, 28 May to 30 September 1977.

Stream section	Percent of anglers				
	Resident	With boat	Fishing with		
			Bait	Lures	Flies
12-A	62.0	16.0	58.1	4.3	37.6
12-B	53.0	0	48.7	19.7	31.6
12-C	48.5	6.0	40.0	16.7	43.3
12-All	52.5	5.9	46.2	15.2	38.7
13-A	47.3	35.3	58.8	15.2	26.0
13-B	48.8	60.4	62.7	14.5	22.8
13-All	48.2	50.5	61.1	14.8	24.1

is the second Most intensively fished section in the study area (3,510 angler hours/km). It also receives the heaviest boat usage, both floaters and motor boats (The angler questionnaire indicated that many anglers feel the motor boats in this area infringe on their fishing experience). With less hatchery support than either 13-A or 12-C, this section produced the lowest catch rate in the study area (1.25 game fish per hour). However, the average size of game fish harvested was well above that of Sections 12-C and 13-A and 11% of the wild rainbow and brook trout were 305 mm (12.0 in) long or greater (Tables 24, 25 and 26).

Sections 12-A and B (McCrea Bridge to the fish trap) probably provided the highest quality fishery in the study area. Both are fished predominately by residents and bait anglers. Section 12-A had the lowest fishing intensity found in the census and little hatchery support. Fishing there is generally poor until Island Park Reservoir begins receding and the large rainbow, cutthroat and kokanee begin ascending the stream. By mid and late summer it provides excellent fishing and has a season catch rate of 2.00 game fish per hour. About 35% of the harvested wild rainbow and brook trout are 305 mm (12.0 in) or longer (Tables 24, 25 and 26).

Section 12-B provides a little more consistent fishing quality throughout the season than 12-A (2.36 game fish per hour). It also receives the highest angling pressure of the three sections below Macks Inn Bridge (3,397 angler hours/km). Harvested wild rainbow and brook trout in this section average over 270 mm (10.6 in) in length and 32% of them exceed 305 mm (12.0 in). This section also has the most significant kokanee fishery in the area, which is responsible for a large part of the fishing pressure in late summer and accounts for the very high average length of all game fish harvested. Hatchery support is minimal (Tables 24, 25 and 26).

#### Trends in Fishing Quality

Comparing the Henrys Fork Creek census data from 1976 with identical sections and time periods for 1977, I found a few significant changes.

Fishing pressure in the area above Macks Inn (Section 13) appeared to have decreased significantly from 1976 (down an estimated 8,045 angler hours). Three factors probably contributed to this estimated decrease. The first is the change in our census methods and aerial to ground counts. Our aerial counts tended to overestimate anglers in this upper section as we could not always tell for sure from the air if a person was actively engaged in fishing. Many people float this section with a fishing pole, but only occasionally wet a line. Also, in canoeing the upper area in 1977, we could not see all side channels or catch up to anglers who were close to completing their fishing drift at the time we began our count. Thus, we were always slightly underestimating the actual fishing pressure. However, these changes in census design alone do not account for such a great decrease. The new six-fish limit (reduced from ten fish in 1976) undoubtedly decreased the fishing pressure and the later rescinded regulation against fishing from motor boats also had an effect.

The total catch rate in upper Henrys Fork increased in 1977, especially below Macks Inn where, despite the six-fish limit and an estimated slight decrease in fishing pressure, more fish were harvested than in 1976 (part of this increase was an early kokanee run). The harvest rate showed a decrease in

Section 13 as would be expected with the tighter limit (Table 27).

Wild rainbow in Section 12 (McCrea Bridge to Macks Inn) appeared to be larger in 1977 than in 1976 by an average of 15 mm (0.6 in). However, much of this apparent increase is probably biased sampling as few of the fish sampled in 1976 came from outside Section 12-C which is now known to produce the smallest fish. The estimated decrease in the mean size of wild rainbow in Section 13 (22 mm) is certainly significant. However, it is possible that some of this decrease is explained by the massive releases of hatchery fingerling in this area in the fall of 1976. There is no way of estimating exactly what percent of the fish measured as wild rainbow were actually these hatchery fingerling, but a conservative estimated would be 10-15%. Brook trout length did not change significantly in either section (Table 28).

The composition of anglers changed significantly from 1976 to 1977. The percent of nonresidents increased greatly and they outnumbered residents in Section 13. Boat angling decreased in both sections, probably due to low water and the new boating regulations. Lure and fly fishing increased while bait fishing decreased (Table 29).

Overall, the quality of fishing in 1977 was about equal to or slightly below that of 1976. Heavier hatchery support in 1977 kept catch rates high, but failed to provide any increase in the size of fish caught.

#### Comparison With Other Trout Streams

To see where the fishery of upper Henrys Fork stands in relation to other trout streams, I compared it with 1975-76 data for a section of the Madison River of Montana (Vincent 1977) and 1974 data for the South Fork of the Boise River in southwestern Idaho (Beach 1975). Both of these streams are generally rated above average in terms of quality trout fisheries and had 10-fish limits during the period of comparison. The harvest in the Madison is exclusively wild rainbow and brown trout while that of the South Fork of the Boise is over 99% wild and hatchery rainbow. While the differences in species composition, regulations and habitat types do not allow for a precise comparison of the streams, the information is still very instructive.

Using nearly identical time periods (spanning May to the end of September), I found that during the past 3 years each kilometer of upper Henrys Fork has received an average of about 4 times the angling pressure found on the Snoball section of the Madison River and about 2.5 times the pressure on the South Fork of the Boise River in 1974. At the same time, each kilometer of upper Henrys Fork has supplied anglers with over 3 times the number of wild trout as harvested on the Madison and 4 times the 1974 harvest on the South Fork of the Boise. The additional harvest of hatchery catchables in the Henrys Fork raises the total trout harvest per kilometer to a magnitude of over 5 times the Madison River harvest. The average total catch rate for these same periods has been about 1.7 trout per hour on Henrys Fork, 1.6 on the Madison River and 0.7 on the South Fork of the Boise River (Table 30).

With the tremendous fishery intensity on upper Henrys Fork, it is not surprising that the average total length of wild rainbow in the creel has been



Table 27. Comparison of angler effort, harvest and catch rate estimates for Sections 12 and 13 of the Henrys Fork of the Snake River from opening day to 31 August of 1976 and 1977.

Year	Angler hours	Harvest								Total game fish		
		Wrb	Hyb	Hrb	Ct	Eb	Salmon	Wf	Total	Released	Harvested per hour	Caught per hour
<div>Section 12</div>												
1976	22,060	4,613	224	3,597	26	4,208	26	26	12,720	19,125	0.58	1.44
1977	20,991	4,846	331	4,611	14 3	2,897	585	364	13,777	38,826	0.66	2.51
<div>Section 13</div>												
1976	32,526	8,018	73	5,507	11 1	9,493	26	843	24,071	13,324	0.74	1.15
1977	24,481	3,543	45	6,572	125	4,313	150	668	15,416	26,332	0.63	1.71

Table 28. Comparison of the mean total lengths and size distribution of trout sampled from anglers' creels in Sections 12 and 13 of the Henrys Fork of the Snake River in 1976 and 1977.

	Wild rainbow				Brook trout			
	Section 12 <sup>1/</sup>		Section 13		Section 12 <sup>1/</sup>		Section 13	
	1976	1977	1976	1977	1976	1977	1976	1977
Number of fish	37	279	159	214	18	156	185	256
%3305 mm (12.0 in)		19	21	8	0	5	4	8
Mean total length (mm)	231	246	261	239	211	204	211	219
Variance <sup>2/</sup>	859.66	4,701.22	6,796.41	4,178.46	1,151.92	2,721.72	1,676.08	2,371.27
Length trend (mm)		+15		-22		- 7		+ 8
Length trend (in)		+ 0.6		- 0.9		- 0.3		+ 0.3
T's		2.222		- 3.240		- 0.745		1.782
T'.05		1.999		1.960		2.078		1.960
Significant difference		Yes		Yes		No		No

<sup>1/</sup> Sampling in Section 12 in 1976 was limited mainly to the upper and lower most areas.

<sup>2/</sup> The variances were non-homogeneous, so an approximate T-test was used to compare the differences in mean total lengths.

Table 29. Comparison of estimated angler profiles for Sections 12 and 13 of the Henrys Fork of the Snake River from opening day to 31 August of 1976 and 1977.

Stream section	Year	Percent of anglers				
		Resident	With boat	Fishing with		
				Bait	Lures	Flies
12	1976	68	19	55	11	34
	1977	54	7	48	15	37
13	1976	60	78	75	9	16
	1977	49	49	61	15	24

Table 30. Comparison of the estimated total angling effort, trout harvest and catch rates for the May-September fisheries of Sections 12 and 13 of the Henrys Fork of the Snake River, the Snoball section of the Madison River and Section 1 of the South Fork of the Boise River.

Stream section	Year	Angler hrs/km/day	Trout harvested per km			Total trout	
			Wild	Hatchery	Total	Harvested per hour	Caught per hour
Henrys Fork - 12 (9.9 km)	1977	19.7 <sup>1/</sup>	890	607	1,497	0.60	2.44
Henrys Fork - 13 (6.8 km)	1977	31.9 <sup>1/</sup>	1,24	1,171	2,415	0.60	1.65
Madison-Snoball	1975 <sup>2/</sup>	3.6	460	0	460	0.92	2.32
Madison-Snoball (7.2 km)	1976 <sup>3/</sup>	9.4	243	0	243	0.25	0.95
South Fork Boise - 1 (9.7 km)	1974	10.6	241	646	887	0.66	0.71

<sup>1/</sup> Angler effort in 1973 and 1976 was estimated to be equal to or greater than the 1977 level.

<sup>2/</sup> Fishing not allowed from boats or floats.

<sup>3/</sup> Both shore and float fishing allowed.

about 61 mm (2.4 in) less than for the Madison River and 50 mm (2.0 in) less than for the South Fork of the Boise River. The difference in mean length for all trout harvested in Henrys Fork and Madison River is even greater. This results from the fact that the remaining 69% of the Henrys Fork trout harvest consists of hatchery catchables and brook trout which are smaller than the wild rainbow, while the remaining 20% of the Madison River trout harvests consists of brown trout which enter the creel at equal or greater lengths than the rainbow (Table 31).

#### Growth Potential

The estimated mean total length of wild rainbow from Sections 12 and 13 Henrys Fork was greater at each age except year one than that estimated for wild rainbow from the South Fork of the Boise River (Mate 1977). Trout growth in Henrys Fork is good and is probably not a significant factor in reducing the average size of rainbow trout in the creel.

The estimated mean total length of brook trout harvested from upper Henrys Fork in 1977 ranged from 24 to 33 mm (0.9 to 1.3 in) less than that for Henrys Lake brook trout at ages one through three sampled in 1950 (Irving 1953). It would be expected that the lake population would show better growth than those fish residing in the stream. While Shetter and Alexander (1970) did not back-calculate brook trout lengths from fish sampled in the North Branch Au Sable River, Michigan, during 1961-67, it appears obvious from their length and age data that Henrys Fork brook trout grow at equal or slightly better rates than the Au Sable fish. The Henrys Fork brook trout growth rate, however, is considerably slower than that of rainbow trout, and very few brook trout survive beyond age four even in areas without fishin<sup>g</sup> mortality. Therefore, it can be expected that brook trout will add substantial numbers of small fish to the Henrys Fork fishery, but lack the growth potential to ever provide significant numbers of fish over 305 mm (12 in) even with greatly reduced fish harvest. The few really large brook trout in the fishery are generally fish which have reared in Henrys Lake or Island Park Reservoir and subsequently migrated to the river.

#### LITERATURE CITED

- Beach, Donald R. 1975. Survey of fish harvest in the South Fork of the Boise River from Anderson Ranch Dam to Arrowrock Reservoir (Job III-f); Survey of fish populations in the South Fork of the Boise River from Anderson Ranch Dam to Arrowrock Reservoir (Job III-e). Idaho Department of Fish and Game. 27 pp.
- Coon, John C. 1977. Henrys Fork fisheries investigations (Job VII). Idaho Department of Fish and Game. 22 pp.
- Irving, Robert G. 1953. Ecology of cutthroat trout, Salmo clarki Richardson, in Henrys Lake, Idaho. MS Thesis, Utah State Agricultural College. 101 pp.
- Mate, Steven M. 1977. South Fork Boise River fisheries investigations (Job V). Idaho Department of Fish and Game. 25 pp.

Table 31. Comparison of the estimated mean total lengths of wild rainbow and all trout harvested by anglers during the May-September fisheries of Sections 12 and 13 of Henrys Fork of the Snake River, the Snoball section of the Madison River and Section 1 of the South Fork of the Boise River.

Stream section	Year	Mean total length			
		Wild rainbow		All trout	
		mm	in	mm	in
Henrys Fork - 12	1977	246	9.7	236	9.3
Henrys Fork - 13	1977	238	9.4	227	8.9
Madison - Snoball	1975	295	11.6	295	11.6
Madison - Snoball	1976	312	12.3	318	12.5
South Fork Boise - 1	1974	293	11.5		

Shetter, D. S. and G. R. Alexander. 1970. Results of predation reduction on brook trout and brown trout in 4.2 miles (6.76 km) of the North Branch of the Au Sable River. Trans. Am. Fish Soc. 99(2): 312-319.

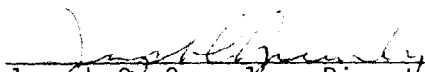
Vincent, E. Richard. 1977. Madison River trout harvest study. Job Progress Report. Montana Department of Fish and Game. 7 pp.


Submitted by:


John C. Coon  
Senior Fishery Research Biologist

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

  
Joseph C. Greenley, Director

  
Stacy Gebhards, Chief  
Bureau of Fisheries

  
Jerry Mallet  
Fishery Research Supervisor  
Bureau of Fisheries